

# INEEL REPORTER

A closer look at science-based environmental management

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2000

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## Waste Area Group 5 Cleanup Underway With Goal Of Saving \$2.4 Million

*A team of INEEL engineers this summer is trying to complete cleanup of septic systems and a waste tank at the site's Power Burst Facility/Auxiliary Reactor Area, in an accelerated effort they anticipate will cut the cost of what was planned as a \$6.4 million project down to \$4 million.*

By focusing this year's effort on cleanup of the septic systems and waste tank, engineers aim to save those remediation dollars by trimming time spent on this aspect of the project from an earlier work estimate of 26 months to just 7 months. Upcoming remediation of 58 acres of cesium-137 contaminated soil at PBF/ARA is being coordinated with the construction of an on-site soil repository.

On June 21, members of the team ran a small remote-operated robot through a pipe at a PBF mineralizing cooling pit that they are characterizing for possible cleanup because of mercury contamination. A video camera on the robot helped them find several joints in the pipe that might be causing rain water to leak into it – a possible source of moisture found in the pit at the pipe's outlet that could hamper remediation work if it's not fixed.

They hope sampling data they are gathering in the pit will reveal that the pit doesn't pose future health or environmental risks if it's not remediated.

**A worker runs a remote-operated robotic camera through a pipe at the Power Burst Facility to inspect the pipe for possible rain water leaks.**



Actions through October are expected to include:

- Removal of a 1,000-gallon underground tank that contains a mixture of radioactive waste and hazardous polychlorinated biphenyls.
- Removal of a radioactive-contaminated sanitary waste system, two seepage pits, and soils beneath two reactor hot cells.
- Sampling and possible removal of parts of a sanitary sewer leach field, two septic tanks and a leach pit.

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The *INEEL Reporter* is a bimonthly DOE newsletter for the public produced by the INEEL Environmental Management Program.

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## More Information

For more information or to request a briefing or a tour about Environmental Management at the INEEL call:

**1-800-708-2680**

Meanwhile, the team is progressing on cleanup of the contaminated soil by fine-tuning its innovative Global Positioning Radiometric Scanner System. The system uses a four-wheel-drive Hummer vehicle fitted with gamma ray detection equipment. It detects and maps ground contamination quicker and more accurately than conventional methods where workers sample soil.

Their goal is to minimize costs of the soil cleanup by minimizing the volume of contaminated soil that workers will need to remove.

Most of the soil was contaminated after a 1961 accident that destroyed the U.S. Army's SL-1 nuclear reactor. The radioactive waste tank and septic system were contaminated during nuclear reactor research that began at PBF/ARA in the late 1950s.

## INEEL Employees Beat An Idaho Settlement Agreement Mandate With Months To Spare

*This spring INEEL fuel handlers, spent nuclear fuel engineers, supervisors and operations staff, equipment operators and radiological control technicians beat by eight months a deadline to move spent nuclear fuel from the Idaho Nuclear Technology and Engineering Center's building CPP 603 underwater storage basins.*

Since the project to empty the three underwater fuel storage basins at CPP-603 began in early 1994, crews have safely moved 1,340 spent fuel units into either modern underwater storage pools or into dry storage. The work was completed ahead of deadlines set in federal court.

On Oct. 16, 1995, the U.S. Department of Energy, the Navy and the state of Idaho entered into an historic agreement that guides management of spent nuclear fuel in Idaho until 2035.

One agreement objective states that INEEL was to transfer all spent nuclear fuel stored at the aging 48-year old facility to another federally approved facility by Dec. 31, 2000.

On April 28, operators pulled the last fuel elements out of the CPP-603 south basin pool and sent them to building CPP-666, the Fluorinel Dissolution Process and Fuel Storage facility – known as FAST.


Placing the spent fuel in the CPP-666 pools or in dry storage is an interim step as INEEL moves to the agreement's requirements to put all spent fuel into dry storage by 2023 and have it "road ready" and shipped out of Idaho by 2035.

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Modern features of the CPP-666 pools built in 1984 include:

- Stainless steel lining (CPP-603 is unlined – the standard design in the 1950s).
- Leak detection systems, heating and ventilation controls.
- Improved water treatment and cleanup systems.
- Improved methods to safely store and manage spent nuclear fuel.

Another key factor in vacating the CPP-603 basins was that they did not meet current seismic standards, although structural analyses performed at the start of the basin-emptying project showed the basins would not catastrophically fail in a seismic event.

INEEL officials plan to decide on the best way to drain and decontaminate the CPP-603 pools, which contain 1.5 million gallons of water and several inches of radioactive sludge. 

## Bioremediation Techniques Part Of Proposed Remedy For Test Area North Cleanup

*INEEL officials invite the public to comment on a recommendation by scientists to replace a traditional pump-and treat method for cleaning up parts of a contaminated groundwater plume beneath INEEL's Test Area North (TAN) with two newer innovative methods.*

INEEL officials soon will release their proposed plan for public review and comment. It will outline how they want to perform cleanup of trichloroethene (TCE)-contaminated groundwater at TAN.

### Combining Convention and Innovation

Under the proposal:

- A pump-and treat system would be installed and used to remove TCE from the part of the contaminant plume known as its medial zone.
- Monitored natural attenuation – instead of pump-and-treat – would be used in the least polluted part of the plume, known as its distal zone.
- A second newer method that INEEL scientists successfully demonstrated at TAN in 1999 called enhanced in situ bioremediation – instead of pump-and-treat – would be used in the most contaminated part of the plume, known as its hot spot.



TCE  
was  
widely  
used as a  
degreaser.

It poses  
cancer risks if  
ingested in sufficient  
quantities. TCE was part of  
the sludge disposed of  
beneath TAN decades ago  
using an injection well that  
was shutdown in the mid-  
1970s.

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## Faster, Better, Cheaper

Both bioremediation technologies use naturally occurring bacteria to destroy TCE by breaking it down into harmless end-products over time, a process known as biodegradation.

INEEL officials have determined that the proposed changes to the TAN cleanup are expected to cost less, and work better and faster than using only the pump and treat technique.

TCE is a widely used degreaser. It was part of the sludge disposed of beneath TAN decades ago using an injection well that was shut down in the mid-1970s.

## Monitored Natural Attenuation

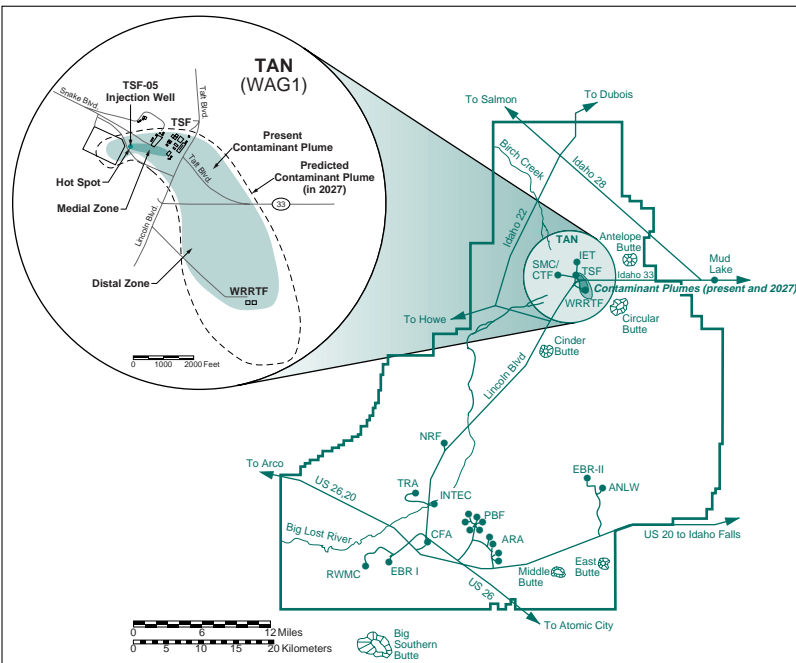
With monitored natural attenuation, periodic groundwater samples gathered over time at strategically placed monitoring wells will be used to confirm innovative computer models that INEEL scientists have developed. These models and groundwater monitoring will track the rate at which monitored natural attenuation is progressing.

The models predict that TCE in a part of the contaminant plume that is least polluted will break down to harmless chemical by-products naturally over a reasonable period of time, before it would pose a threat to people or the environment.

And the models predict that monitored natural attenuation will achieve cleanup in the least polluted part of the plume for less money than pump-and-treat technology would in the same area of the plume. Groundwater data from

1989 to 1997 provided the basis for this recommendation. By comparing TCE concentrations in the most diluted part of the plume to those of two other contaminants, tetrachloroethene and tritium, scientists determined that TCE is degrading there at a rate that will meet cleanup objectives called for in the cleanup's 1995 Record of Decision.

Based on total net present value, the life-cycle cost for monitored natural attenuation over 30 years would be \$1.34 million. Pump-and-treat costs during the same period would be \$4.78 million. To compare technology costs, a 30-year life cycle cost estimate was used.



**The contaminated groundwater plume where cleanup is underway at Test Area North.**

Along with cost effectiveness, monitored natural attenuation is predicted to meet cleanup action objectives in the Record of Decision within the required time – by 2095. As a conservative measure, scientists would routinely evaluate monitoring data to verify that the method continues to effectively cleanse the aquifer over the expected time period.

The plume is predicted to grow by an estimated 30 percent until 2027 before it begins decreasing forever, but that growth isn't into areas that would pose a risk.

If four successive annual groundwater monitoring rounds indicate that monitored natural attenuation won't meet the cleanup goals by 2095, then either pump-and-treat or the best technology available at the time would be used.

### Enhanced In Situ Bioremediation

Scientists during the past year demonstrated that enhanced in situ bioremediation efficiently breaks down TCE in the hot spot. A harmless food preservative called sodium lactate is injected into the aquifer, feeding naturally-occurring bacteria to increase their numbers – helping them break down TCE quicker than would happen naturally over time. Where enhanced in situ bioremediation is used, the technique is predicted to meet cleanup action objectives within 15 years – two to six times faster than pump-and-treat. ➡

## Transuranic Waste Program Making Progress

*Transuranic waste is being characterized and certified for disposal at the Waste Isolation Pilot Plant in New Mexico. INEEL must remove 3,100 cubic meters (15,000 drums) of transuranic waste from Idaho by Dec. 31, 2002.*

An audit on the debris portion of INEEL's Transuranic Waste Program has been completed and the program's focus is shifting to its next audit. An audit on the solidified portion of the Transuranic Waste Program is currently scheduled for late fall. Solidified waste is a product of aqueous treatment systems and looks like sludge.

The U.S. Department of Energy's Carlsbad Area Office will perform an audit to certify INEEL to characterize and ship this waste form to the Waste Isolation Pilot Plant.

Argonne National Laboratory-West and INEEL are investigating using the Argonne facility to provide a recovery mechanism for drums that contain prohibited items. A glove box used for visual examination of the quality control drums may be used to treat (absorb liquids, puncture pressurized cans, remove items, etc.) drums that are currently being set aside for future work. This would provide additional shippable inventory toward meeting the milestone. ➡

Bioremediation uses living things (usually microorganisms) to clean up the environment through the capture or breakdown of environmental contaminants.





## Decision To Close WERF Incinerator Made

INEEL decided to close its incinerator at the Waste Experimental Reduction Facility (WERF) rather than upgrade it to meet more stringent emission standards set by the U.S. Environmental Protection Agency. The incinerator has been treating mixed low-level waste since 1995. It will cease operating on Sept. 30, 2001.

INEEL will close its incinerator at WERF no later than Sept. 30, 2001. This closure reflects a decision to use commercial facilities and non-thermal processes to treat mixed low-level radioactive waste, rather than upgrade the incinerator to meet new EPA air emissions standards.

A draft Notice of Intent to Comply document that outlines these plans and INEEL's compliance strategy will be finalized and forwarded to the state of Idaho and EPA to provide official notice that the WERF incinerator will be shut down.

INEEL considered two primary factors in making the decision not to upgrade the incinerator. The first was a lack of sufficient waste throughout the DOE complex that would be sent to WERF for incineration. The second was the actual and projected increased availability of commercial treatment and disposal facilities. INEEL officials determined it was cheaper to use commercial treatment than to upgrade and operate the WERF incinerator.



Workers using a plasma arc torch during sizing operations at WERF.

Non-thermal treatment options include stabilization, macroencapsulation and sizing. Stabilization is a process that binds up contaminants in a non-waste matrix so they don't leach into the environment. Macroencapsulation uses an impenetrable barrier to encase the waste. Sizing of mixed low-level waste – cutting it into pieces that fit into containers – will be used as a pre-treatment step for onsite and offsite treatment, and for off-site disposal. The potential of commercial waste incineration also will be considered as a treatment option for INEEL wastes that must be incinerated. ▼

## Briefly

DOE and DEQ agree on how to resolve waste compliance issues. In June, U.S. Department of Energy officials and Idaho regulators signed a voluntary consent order, in which DOE agreed to resolve several hazardous waste issues found during DOE-initiated inspections at INEEL. It Required DOE to do a site-wide inventory of many storage tanks and ensure the tanks meet applicable environmental standards; determine if certain uncharacterized wastes are hazardous; transfer certain hazardous wastes to proper storage areas; and bring certain inactive underground piping into compliance. ▼

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▶ DOE will hold a public hearing Aug. 25 in Idaho Falls on the draft Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility. The hearing will start with presentations at 6:30 p.m., with public comment at 7 p.m. It will be held at the WestCoast hotel, formerly Cavanaugh's on the West Bank. ▼

## How to Get Involved

Citizens are encouraged to get involved in decision-making at the INEEL by reviewing and commenting on documents, attending public meetings, and requesting briefings or tours. Information about these public involvement activities can be obtained through:

### Target Mailing Lists

Mailing lists are continually updated so interested citizens and groups can automatically receive general or specific INEEL information (electronically or through U.S. Mail). You can be added to mailing lists by calling the INEEL toll-free number.



### Toll-Free Phone Number

To obtain specific documents or other information, request a speaker or briefing on a particular topic, inquire about public meetings or public comment periods, or schedule a tour of INEEL, call the INEEL toll-free number at 1 (800) 708-2680.



### Videos/Instructional Materials

Videos and brochures are available on a variety of subjects including the Snake River Plain Aquifer, waste management, and general INEEL history. To request these items, call the INEEL toll-free number.



### Internet

The INEEL Home Page is available at <http://www.inel.gov>. Specific INEEL environmental information is available at <http://environment.inel.gov>. The INEEL Administrative Record is available at <http://ar.inel.gov/home.html>.



### Information Repositories

DOE maintains three information repositories throughout Idaho. Information repositories are collections of documents that provide detail and backup information on INEEL cleanup projects.



INEEL Technical Library  
DOE Public Reading Room  
1776 Science Center Drive  
Idaho Falls, ID 83415

Albertson Library  
Boise State University  
1910 University Drive  
Boise, ID 83725

University of Idaho Library  
University of Idaho Campus  
434 2nd Street  
Moscow, ID 83843



### **INEEL Idaho Falls Office**

The INEEL Community Relations Office is located in Idaho Falls and can provide information and briefings on environmental management topics. Call the INEEL Community Relations Plan Coordinator, Erik Simpson, at (208) 526-4700, or call the INEEL toll-free number.



### **INEEL Boise Regional Office**

An INEEL Regional Office is located in Boise to provide information and other resources for those living in the western portion of the state. The office is located at 800 Park Blvd., Suite 790, Boise, Idaho 83712, or call (208) 334-9572.



### **INEEL Jackson, Wyoming Office**

An INEEL Regional Office is located at 310 A. E. Pearl Avenue to provide information and other resources for those living in Wyoming. Call INEEL Public Information Liaison, Lorie Cahn, at (307) 732-2990.



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